

# **IB102**

**Freescale i.MX6 ARM Cortex™-A9  
Embedded BOARD**

## **USER'S MANUAL**

**Version 1.0**

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# Introduction

## Product Description

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The IB102 embedded board is based on the Freescale iMX6 ARM processor .iMX6 Solo is a high-performance ARM Cortex-A9 with speeds up to 1GHz. The device offers 3D graphics acceleration while also supporting numerous peripherals, including DDR3 and USB OTG PHY that are well suited for industrial applications.

### **IB102 Features:**

- Freescale I.MX6 1GHz ARM Cortex-A9 microprocessor
- 1G Byte DDR3 RAM
- 1x 24 bit LVDS connector
- 1x COM Port (RJ-45) connector
- 1x Mini-PCIe(x1) Slot
- 1x 10/100/1000 Based-T Ethernet (RJ-45) connector (supports PoE+)
- 12V DC-in power connector
- 1x SD Card Slot
- 1x EMMC flash
- 1x USB OTG
- 2x USB host(1 x USB A-Type, 1 x pin header)
- 10 Bits GPIO (option)
- Resistive touch connector
- Capacitor touch connector
- 1x microphone / 1x speaker

### Outlook



## **Checklist**

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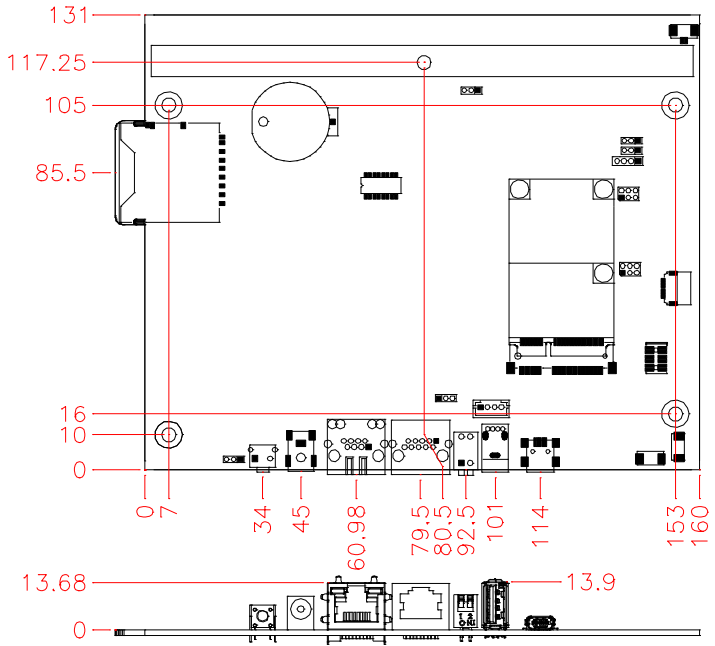
Your IB102 package should include the items listed below.

- The IB102 Embedded board
- This User's Manual

## IB102 Specifications

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Form Factor</b>                   | Specified for MRS-801                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>CPU</b>                           | Freescall I.MX6 Cortex A9 1Ghz Solo: [PN: C0186S5EVM1010000P as ARM MB1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>System Memory</b>                 | X32 DDR3 or 1G on board memory, (refer to ARM MB1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Data Memory</b>                   | SD slot support up to 32GB<br>eMMC 4GB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Display</b>                       | 18/24bit LVDS header x1<br>4/5-wire resistive touch header x1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>LAN</b>                           | 10/100/1000 Transformer + RJ45<br>Athoros 8031 Phy / RGMII interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>USB</b>                           | 4 port USB Hub<br>1xUSB 2.0 host @ edge<br>1xUSB header for Capacitive touch<br>1xUSB for miniPCIE, (refer to RP100)<br>1xUSB hear (reserved for other extension test purpose)<br>OTG:<br>1xOTG@ edge, via USB miniAB type                                                                                                                                                                                                                                                                                                                                                         |
| <b>Power Control</b>                 | Freescall new F0AEP PMIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>PoE+</b>                          | - PoE+: TI TPS23754 PoE+ level 25W, 802.3at type1,2<br>- Power Transformer: 835-01064F, (Eleceltek)<br>- Shielded Power Inductors: LPS4414                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Touch Controller</b>              | 4/5-wire design support: PM6000 IC by UART interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>RTC</b>                           | Refer to IB112 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Audio</b>                         | Wolfson audio code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Edge I/O</b>                      | <ul style="list-style-type: none"> <li>• 10/100/1000 LAN x1</li> <li>• USB x 1 (USB Host. Vertical A-Type)</li> <li>• USB OTG x 1 (mini AB type)</li> <li>• COM1 RS-232/485 x 1 by RJ45 connector</li> <li>• LEDs light bar x 1 (3xGPIO pin control Red, Blue and Green);</li> <li>• SD slot x 1</li> <li>• Reset/ GPI option button ( HW option design by jumper)</li> <li>• 2 pin dipswitch x1 for RS232/485 selection</li> <li>• 12(+/- 5%)V DC-IN Jack x 1, C1213511IDJD03000P</li> </ul>                                                                                      |
| <b>Headers &amp; Expansion Slots</b> | Headers:- <ul style="list-style-type: none"> <li>• LVDS Connector x 1</li> <li>• GPIO x 10pin, pitch 2.0 with 3.3V</li> <li>• COM2 (RS232) x 1 (pitch 2.0,COM2 also for debug port)</li> <li>• Audio pin Header x3 (Mic x1 /Speaker x2)</li> <li>• touch connector ( for I2C touch,by 7080K-F12N-04L)</li> <li>• Battery: BR2032 with socket</li> <li>• RS422 selection jumper.</li> <li>• <b>5 wired</b> resistive touch header x1 for touch FPC. (solder side)</li> <li>• Evaluate heat sink with ME</li> <li>• Slots: <b>Full Mini PCIe(x1) also with USB signal</b></li> </ul> |
| <b>Power</b>                         | 12(+/- 5%)V DC-IN or PSE IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Board Size</b>                    | 131mm x 160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Temperature</b>                   | 0~60C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Software Support</b>              | 1. Android 4.3/ Android 4.0 will depend on 4.3 porting situation.<br>2. Linux 3.0 kernel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Board Dimensions



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## **Installations**

This section provides information on how to use the jumpers and connectors on the IB102 in order to set up a workable system. The topics covered are:

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## **Setting the Jumpers**

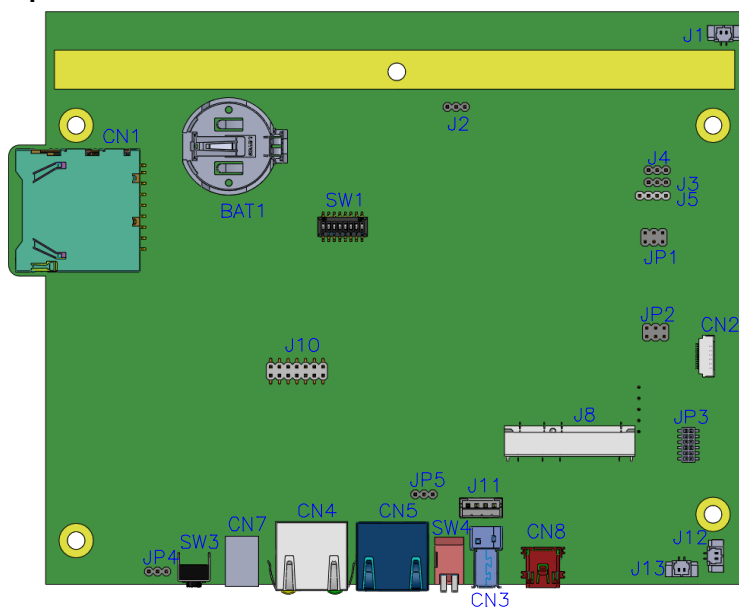
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Jumpers are used on IB102 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IB102 and their respective functions.

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## Jumper Locations on IB102

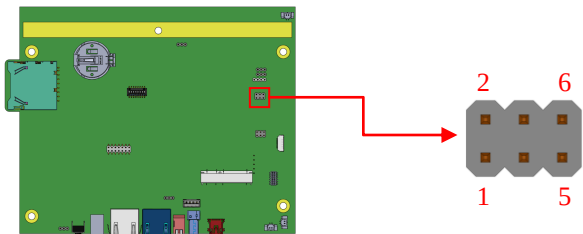
### Top Side



### Bottom Side



**JP1: Touch Pad Wire Setting**

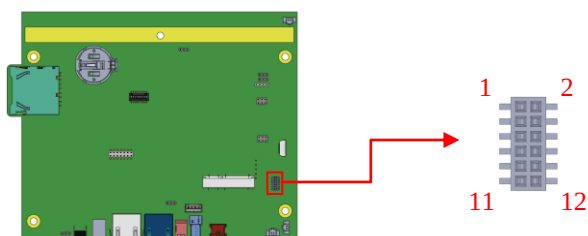


| JP1 | Setting               | Function                     |
|-----|-----------------------|------------------------------|
|     | Pin 1-2<br>Short/Open | 4 or 8 wire/5 wire (Default) |
|     | Pin 3-4<br>Short/Open | 4 or 8 wire/5 wire (Default) |
|     | Pin 5-6<br>Short/Open | 4 or 8 wire/5 wire (Default) |

**JP2: Touch USB/UART Mode Setting**

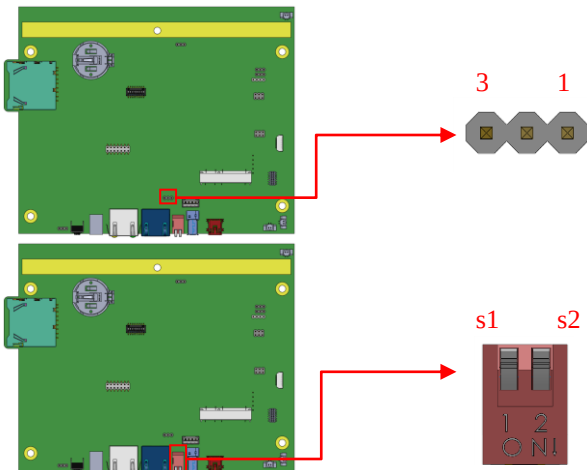


| JP2 | USB Setting*            | Function         |
|-----|-------------------------|------------------|
|     | Pin 1-3<br>Short/Closed | USB              |
|     | Pin 2-4<br>Short/Closed |                  |
| JP2 | UART Setting            | Function         |
|     | Pin 3-5<br>Short/Closed | UART*            |
|     | Pin 2-4<br>Short/Closed | Baud rate 19200* |
|     | Pin 4-6<br>Short/Closed | Baud rate 9600   |

**JP3: Program Interface (Factory use only)**

**JP4: System reset/GPIO Mode Setting**

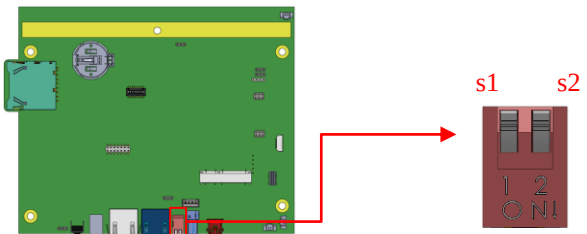

| JP4 | Setting                 | Function               |
|-----|-------------------------|------------------------|
|     | Pin 1-2<br>Short/Closed | GPIO                   |
|     | Pin 2-3<br>Short/Closed | System Reset (Default) |

**JP5, SW4 (S2): RS-232/422/485 Mode Selection**



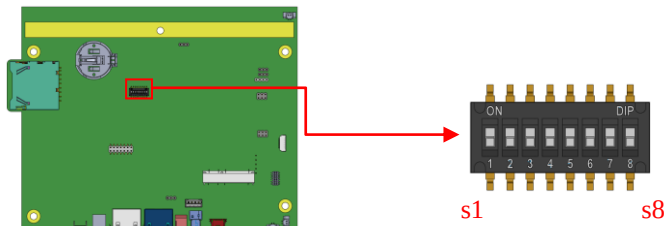
| COM1 Mode | SW4 (S2)      | JP5                 |
|-----------|---------------|---------------------|
| RS-232    | Off (Default) | 2-3 Short (Default) |
| RS-485    | On            | 2-3 Short           |
| RS-422    | Off           | 1-2 Short           |

**SW4 (S1): RS-422/485 Device Termination Selection**



| SW4 (S1) | Device Mode             |
|----------|-------------------------|
| On       | None Terminal (Default) |
| Off      | Terminal                |

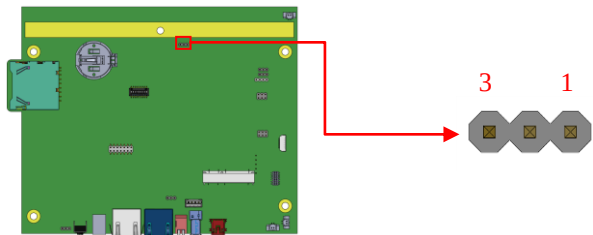
**SW1 (S1, S2, S3, S4, S5, S6, S7, S8): System Boot Configuration**

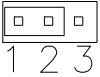
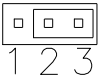


| SW1<br>(S1, S2, S3, S4, S5, S6, S7, S8) | Boot Mode  |
|-----------------------------------------|------------|
| 10100010                                | SD         |
| 01010110                                | NAND FLASH |

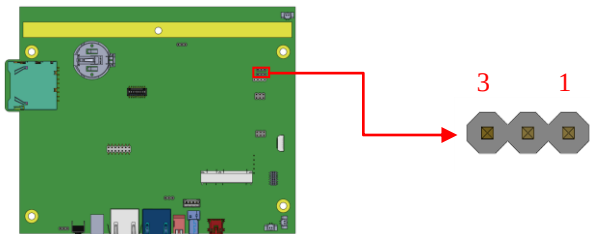
Note:  
1: Switch On  
0: Switch Off

**J2: BL Voltage Setting**



| J2                                                                                  | Setting                 | Panel Voltage |
|-------------------------------------------------------------------------------------|-------------------------|---------------|
|  | Pin 1-2<br>Short/Closed | 5V (default)  |
|  | Pin 2-3<br>Short/Closed | 12V           |

**J3: BL ADJ Level Setting**



| J3                                                                                | Setting                 | Panel Voltage  |
|-----------------------------------------------------------------------------------|-------------------------|----------------|
|  | Pin 1-2<br>Short/Closed | 5V             |
|  | Pin 2-3<br>Short/Closed | 3.3V (default) |

**J4: LVDS Panel Power Selection**



| J4                                                                                  | Setting                 | Panel Voltage  |
|-------------------------------------------------------------------------------------|-------------------------|----------------|
|  | Pin 1-2<br>Short/Closed | 5V             |
|  | Pin 2-3<br>Short/Closed | 3.3V (default) |

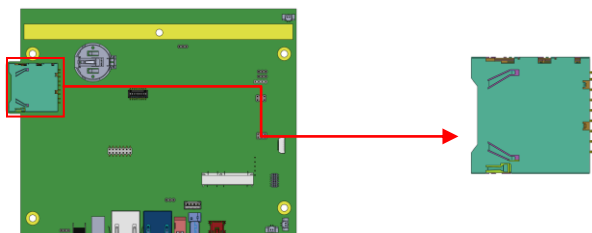
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## **Connectors on IB102 MRS**

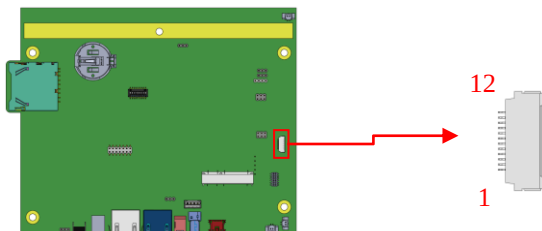
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|                                                      |    |
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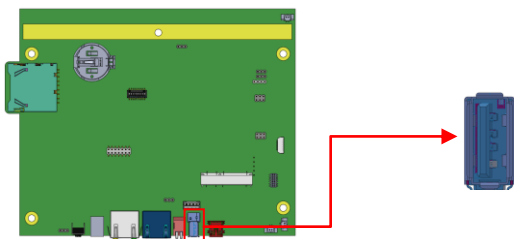
### CN1: SD Card Connector



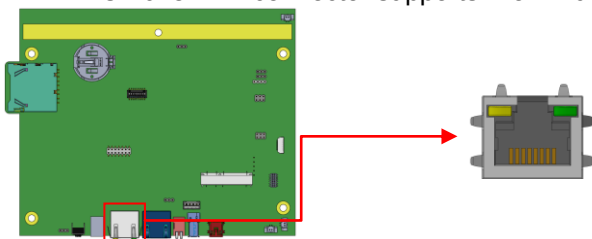
### CN2: Capacitor Touch Pad Connector



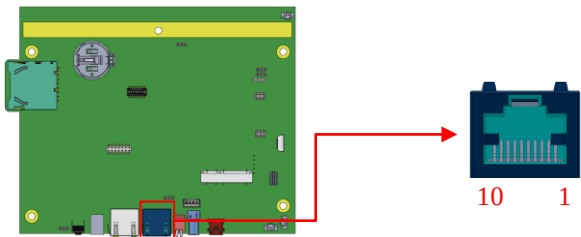
| Pin # | Signal Name |
|-------|-------------|
| 1     | GND         |
| 2     | NC          |
| 3     | NC          |
| 4     | NC          |
| 5     | NC          |
| 6     | GND         |
| 7     | SDA         |
| 8     | SCL         |
| 9     | NC          |
| 10    | INT         |
| 11    | 3.3V        |
| 12    | 3.3V        |

**CN3: USB 2.0 Connector****CN4: 10/100/1000Mb LAN (PoE+ supported)**

This RJ45 LAN connector supports PoE+ function.



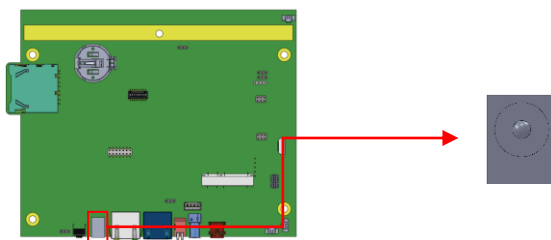
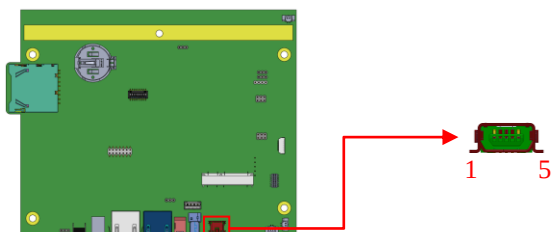
**CN5: COM1 RJ45 Connector**



| Pin # | Signal Name                   |
|-------|-------------------------------|
| 1     | COM1 DSR, Data set ready      |
| 2     | GND                           |
| 3     | GND                           |
| 4     | COM1 RXD, Receive data        |
| 5     | COM1 TXD, Transmit data       |
| 6     | COM1 DCD, Data carrier detect |
| 7     | COM1 DTR, Data terminal ready |
| 8     | COM1 CTS, Clear to send       |
| 9     | COM1 RTS, Request to send     |
| 10    | NC                            |

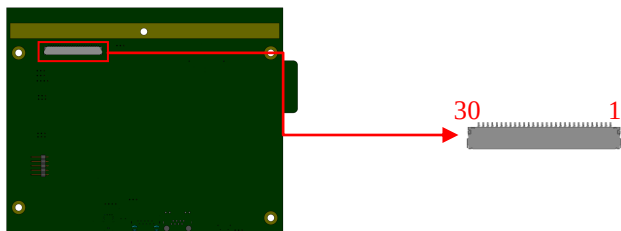
*COM1 is jumperless for RS-232, RS-422 and RS-485 and configured with SW4 (S2) and JP5 Selection.*

| Pin # | Signal Name |        |        |
|-------|-------------|--------|--------|
|       | RS-232      | R2-422 | RS-485 |
| 1     | DSR         | NC     | NC     |
| 2     | Ground      | Ground | Ground |
| 3     | Ground      | Ground | Ground |
| 4     | RX          | TX+    | DATA+  |
| 5     | TX          | RX+    | NC     |
| 6     | DCD         | TX-    | DATA-  |
| 7     | DTR         | RX-    | NC     |
| 8     | CTS         | NC     | NC     |
| 9     | RTS         | NC     | NC     |
| 10    | NC          | NC     | NC     |

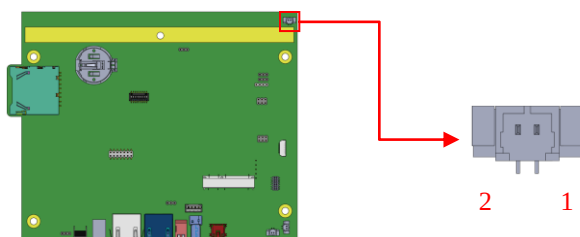
**CN7: +12V DC-IN Power Connector****CN8: Mini USB OTG Connector**

| Pin # | Signal Name |
|-------|-------------|
| 1     | +5V         |
| 2     | D-          |
| 3     | D+          |
| 4     | ID          |
| 5     | GND         |

Note: CN8 will be used for USB device when ID is floating.

**CN9: LVDS Connector**

| Pin # | Signal Name |
|-------|-------------|
| 1     | NC          |
| 2     | LCD_VDD     |
| 3     | LCD_VDD     |
| 4     | NC          |
| 5     | TX0-        |
| 6     | TX0+        |
| 7     | GND         |
| 8     | TX1-        |
| 9     | TX1+        |
| 10    | GND         |
| 11    | TX2-        |
| 12    | TX2+        |
| 13    | GND         |
| 14    | CLK-        |
| 15    | CLK+        |
| 16    | GND         |
| 17    | TX3-        |
| 18    | TX3+        |
| 19    | GND         |
| 20    | GND         |
| 21    | GND         |
| 22    | GND         |
| 23    | GND         |
| 24    | NC          |
| 25    | BKLT_ADJ    |
| 26    | BKLT_EN     |
| 27    | N           |
| 28    | BKLT_VCC    |
| 29    | BKLT_VCC    |
| 30    | BKLT_VCC    |

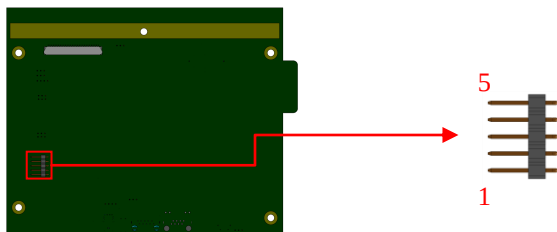
**J1: Mic Connector**

| Pin # | Signal Name |
|-------|-------------|
| 1     | MIC Input   |
| 2     | GND         |

**J5: COM2 RS232 Connector, Debug Port Connector  
(Factory use only)**

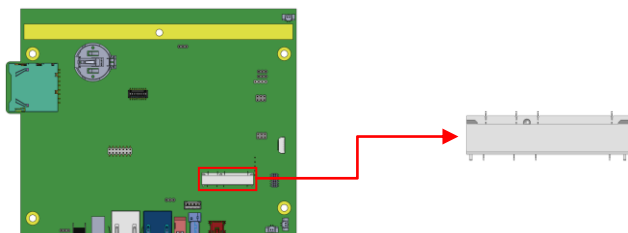
| Pin # | Signal Name             |
|-------|-------------------------|
| 1     | COM2 RXD, Receive Data  |
| 2     | COM2 TXD, Transmit Data |
| 3     | GND                     |
| 4     | NC                      |

### J7: Resistive Touch Panel Connector

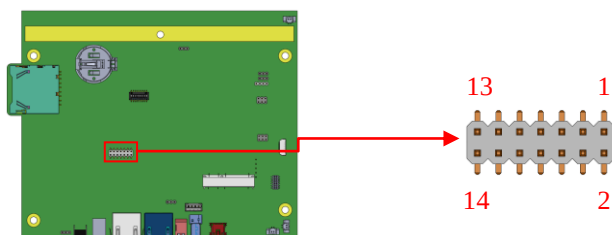


| Pin # | Signal Name |
|-------|-------------|
| 1     | Touch XP    |
| 2     | Touch XM    |
| 3     | Touch SG    |
| 4     | Touch YP    |
| 5     | Touch YM    |

### J8: Mini PCI-E Connector

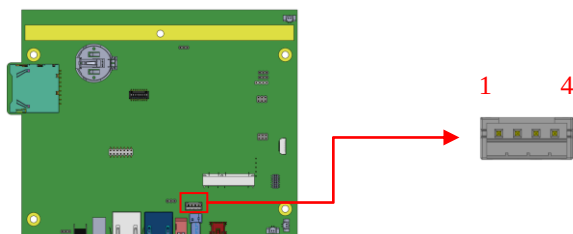


## J10: Digital In/Out Connector



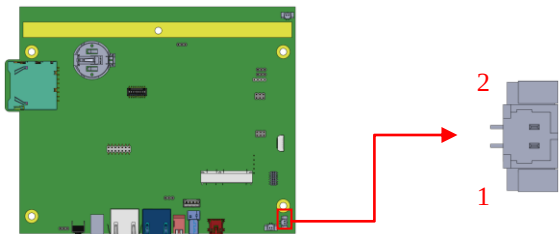
| Signal Name | Pin # | Pin # | Signal Name |
|-------------|-------|-------|-------------|
| 3.3V        | 1     | 2     | GPIO2       |
| GPIO1       | 3     | 4     | GPIO5       |
| GPIO3       | 5     | 6     | GPIO8       |
| GPIO7       | 7     | 8     | Reset       |
| GPIO9       | 9     | 10    | Watch Dog   |
| GPIO10      | 11    | 12    | GPIO11      |
| GPIO12      | 13    | 14    | GND         |

## J11: USB2.0 Connector



| Pin # | Signal Name |
|-------|-------------|
| 1     | +5V         |
| 2     | D-          |
| 3     | D+          |
| 4     | GND         |

**J12: Speaker Right-Out Connector**



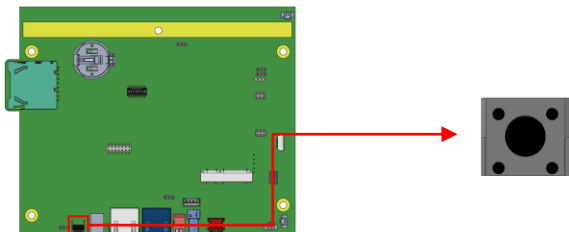
| Pin # | Signal Name    |
|-------|----------------|
| 1     | SPEAKER_RIGHT+ |
| 2     | SPEAKER_RIGHT- |

**J13: Speaker Left-Out Connector**



| Pin # | Signal Name   |
|-------|---------------|
| 1     | SPEAKER_LEFT- |
| 2     | SPEAKER_LEFT+ |

**SW3: System Reset Button**



**OutLook**